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*work out time
to 02 1/30/49*

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In replying please address:

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January 5, 1959

Dear Sir:

In accordance with recent discussions with your technical representative, we are herewith submitting a proposed research program directed toward an investigation of the feasibility of developing a method for

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In regard to the proposed consideration of an appropriate technique, it is our understanding that,

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Two important variables should be considered in the planning and implementation of the proposed research; these are the

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Consequently, it appears that the types of materials that fall in the following categories should be considered in the proposed effort: (1) a liquid, contained in a thin flexible membrane, that would harden to a flexible solid; (2) a liquid or semisolid which could be foamed in place; and (3) a semisolid which would harden to a flexible solid.

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Because of the nature of the application of interest, it is considered preferable that the hardening reactions take place at room temperature. However, it is possible that the reactions could be activated by the application of heat through a small metallic rod or strip inserted in the forming material, the heat being applied to the outer end of the metallic item.

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The following represent materials which may merit investigation in connection with the development of an appropriate procedure:

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- (1) Liquids contained in a membrane
 - (a) Membrane materials (must be thin, but strong)
 - (1) Rubber
 - (2) Polyethylene
 - (3) Polypropylene
 - (4) Polyvinyl chloride (PVC)
 - (b) Liquids
 - (1) Flexible polyesters
 - (2) Epoxy polyamides
 - (3) Epoxy polysulfides
- (2) Foam materials, with or without a membrane
 - (a) Isocyanates
 - (b) Phenolic (flexible ?)
 - (c) Polystyrene beads - epoxy resin
 - (d) PVC plastisol with blowing agent
- (3) Semisolids
 - (a) Room-temperature-curing rubbers, such as Thiokol and silicones
 - (b) Gunk molding compounds
 - (c) Gels - highly loaded epoxy or polyester (polyvinyl alcohol - pigment systems)
 - (d) Hot melts - ethyl cellulose, polyvinyl butyral, etc.
 - (e) Metal alloys - Hg-Ag.

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As currently contemplated, the initial effort in the proposed program would be directed toward a further exploration of the pertinent characteristics of typical systems based on the above-indicated materials, within the limits of the time and funds provided; [] would be utilized to facilitate this exploration. Those systems or materials which showed promise would be evaluated further [] In accord with the discussion presented above, consideration would be given to methods of hardening the materials, if necessary, and to techniques for stiffening or reinforcing them. On the basis of our current thinking, it appears that a considerable variety of materials with possibly applicable characteristics is available; consequently, it is contemplated that the emphasis in the proposed research would be directed toward considerations pertaining to the procedural steps to be carried out in utilizing the pertinent characteristics.

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It is believed that the above-outlined research would provide information on the basis of which the feasibility of the procedure of interest could be evaluated. Such an evaluation would be performed on a continuing basis, i.e., as sufficient pertinent data were obtained from the proposed experiments. If, as expected, the results of the proposed effort were favorable, then recommendations regarding the merits of further investigation of specific materials and procedures would be provided to your technical representative; it is considered likely that such additional study would be directed toward improving particular procedures for

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applying specific materials, respectively - for example, by considering methods of adjusting the consistency and/or curability of the forming materials. Of course, any such additional research would probably have to be provided for under another contractual arrangement.

During the course of the proposed research, liaison would be maintained with your technical representative by discussions during his periodic visits. At the conclusion of the proposed research period, a summary letter report would be submitted that described the materials and methods considered and investigated, the results obtained, and any pertinent recommendations based on the research performed.

We propose to undertake this effort over a period of three months, starting on the date of acceptance of authorization from the Contracting Officer to proceed. The proposed investigation could be conducted under the amendment to Task Order No. CC that was proposed in our letter dated December 18, 1958. The Work Order would be a period-basis research agreement; it could be similar in form to that used previously under Task Order No. CC and the same administrative procedure would be followed. The Work Order would require only that the research be directed toward the objective outlined above, within the limits of the time and funds provided.


It is estimated that an appropriation of \$2,993, including the fixed fee, is needed to fund the proposed program for the three-month period. A general breakdown of the estimated costs is attached.

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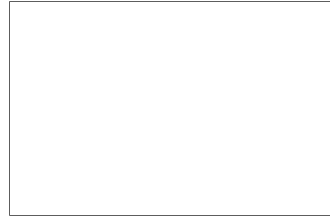
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If any additional information is needed, please let us know. You may direct any inquiries of a contractual nature to  at Extension 159.

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Very truly yours,



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EES:th

In Duplicate

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Proposal of to the U. S. Government.

For Research on **A Study of the Development of a Specialized Method for Preparing**

Based upon a period-basis Contract for a research period of **3 months.**

(Including time for submission of all reports. The proposed contract will not provide for earlier conclusion of the research.)

ESTIMATED COSTS

We expect that the cost of this research for the period indicated above may be distributed approximately as set forth hereon, subject to the understanding that this allocation is merely an estimate, and actual costs incurred may vary from the categories shown. We have determined that these estimates are reasonable and consistent with established policies in its research for the various Government agencies, which policies are briefly discussed below and will be followed in determination of our actual costs hereunder.

Materials & Supplies, etc.

(Including any equipment which may be purchased as necessary in performance of the research. Charges of \$25 or less are excluded from this item.)

Use of Equipment and Technical Services, Travel, and Misc.

(Including applicable costs of technical research and service divisions, and use of technical equipment, except that any undistributed balances of these accounts will be included in overhead. Cost of travel includes reasonable actual subsistence expenses and the actual cost of transportation. An allowance of up to 8¢ per mile for all necessary travel by privately owned conveyance is included in lieu of the cost of such travel.)

Salaries & Wages

(Including our predetermined accrual for vacation, holiday, and sick-leave pay, pensions, and social security.)

<i>Type of Employee</i>	<i>No. of Man-Months</i>	<i>Estimated Cost</i>
Supervision	1/3	<div style="border: 1px solid black; width: 60px; height: 30px; margin: 0 auto;"></div>
Research Engineers	1-2/3	
Lab. Assistants	Nominal	Nominal
Steno., Clerical,		
Shop & Photo., etc.	Nominal	Nominal
Total Salaries & Wages		<hr/>

Overhead

60 per cent of salaries and wages, as they are defined above. Provisional monthly reimbursement will be at the rate of 60 per cent of salaries and wages, as so defined, or at such other provisional rate as may from time to time be mutually agreed upon with the Government's audit representatives. This is a provisional rate for current reimbursement, which we have arrived at by negotiation with Government representatives, and it will be subject to retroactive revision to the "actual" rate agreed upon with them for each calendar year following a detailed audit for that year. The item of overhead includes general research, charges of \$25 or less for materials and supplies, and other categories of costs we customarily include in our overhead account. Cash discounts on all purchases will be credited to overhead, instead of to the amount of the purchase. Scrap of appreciable value will be credited directly to the project. All other scrap will be credited to the overhead account, in which the Government participates.)

Total Estimated Cost

Fixed Fee

*Please let us have your acceptance in our hands by **February 16, 1959** Contract Price

Unless we extend the time, your acceptance after that date will be subject to agreement.

\$2,993